Significance *of* Abraded *and* Weathered Mammalian Remains *from* Rancho La Brea

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SIGNIFICANCE OF ABRADED AND WEATHERED MAMMALIAN REMAINS FROM RANCHO LA BREA

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The dense accumulations of mammalian remains encountered in the Pleistocene asphalt deposits of Rancho La Brea furnish mute evidence of the unusual conditions of miring and trapping that prevailed at this locality during the active periods of the tar pools. The abundance of skull and skeletal materials and the excellent state of preservation of the specimens suggest rather strongly that in the process of entombment the struggles of a mired form frequently hastened its total immersion and disappearance from the surface.

Information derived from a study of the Rancho La Brea collection in the Los Angeles Museum clearly indicates that a rapid entombment of the mired hosts may not always have taken place. It seems safe to assume that in some instances the bodies of animals trapped in the tar were disturbed or dismembered and the skeletal elements scattered before actual deposition occurred. Moreover, it appears possible that osseous remains accumulated along or near the borders of the pools where the carcass of a mammal may have been subjected to the forces of the weather and to disturbance by other creatures before entering the asphalt record. An inference may be drawn therefore that members of the carnivore group were often attracted to the traps not only by the sense of sight but by the sense of smell as well, significant perhaps in accounting for the noticeable prevalence of such forms as the dire wolves *(Ænocyon)*.

It is intended in the present paper to direct attention to two types of evidence on which these assumptions are based.

ABRASIONS

Skeletal elements are present in the collection which exhibit surface effects clearly due to attrition by organic forms, presumably carnivores and rodents. This abrasion is occasionally quite striking, as for example in a tibia of the large lion, *Felis atrox,* shown in Figure 1. In this specimen, exhumed at a depth of approximately 10 feet, in Pit 13 of the Los Angeles Museum excavations, at least two types of tooth-marking are to be noted:

(1) Relatively large abrasions in which chips of bone several centimeters in length have been flaked off or broken away. Apparently in some cases the bite has been strong enough to expose the marrow cavity.

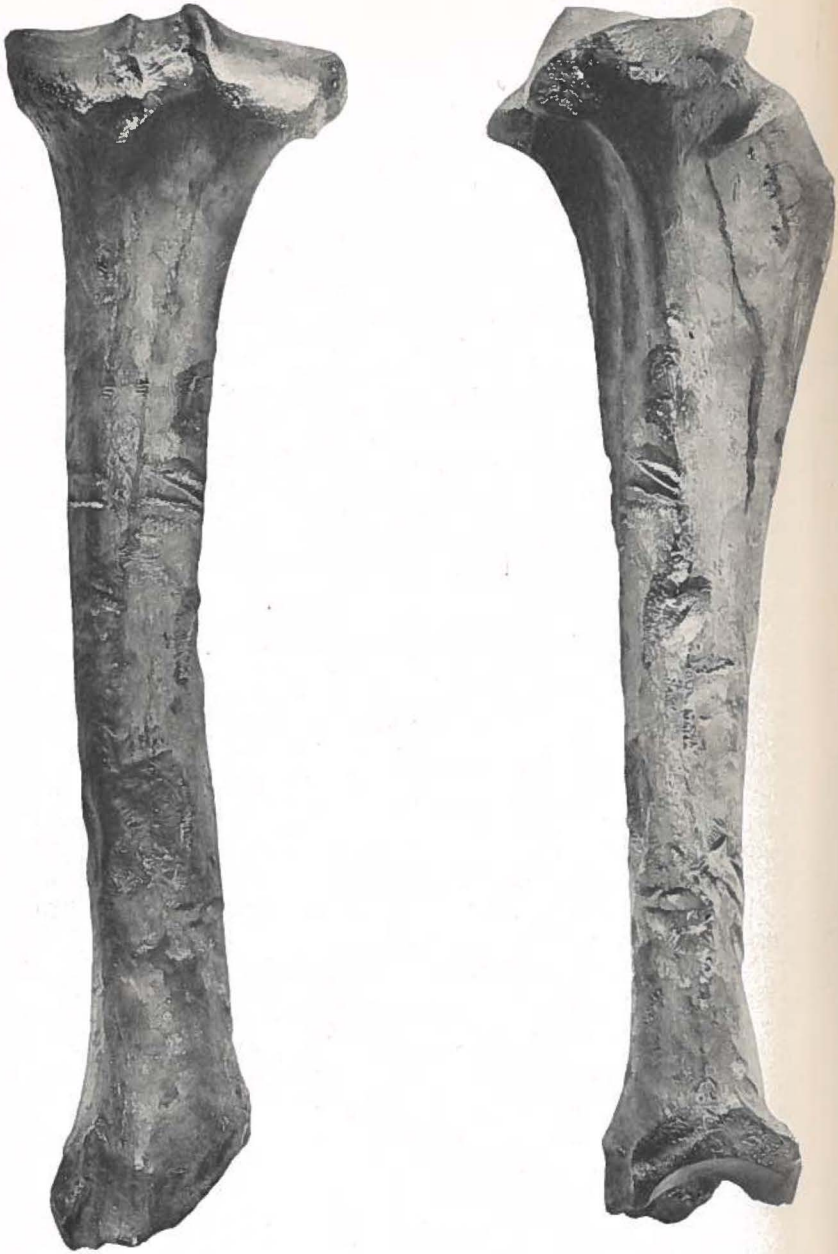

PLATE 1

PLATE 2

(2) Small abrasions usually in the form of grooves, approximately a millimeter in width, and sometimes parallel. An individual groove frequently exhibits on closer inspection minute transverse ridges representing stages in the production of the groove by the chisel-like edge of the incisor teeth of rodents.

Occasionally the two types of markings are superimposed. Small tooth abrasions may be found on the margins of an area from which a flake has been broken, or a large abrasion may be traversed by a groove. It is apparent also that the mammals intent upon breaking or gnawing a particular bone found a convenient grasp along the more pronounced borders, for the latter are often scarred.

The markings referred to are obviously not the result of attrition of skeletal elements due to movement of this material in the petroliferous mass, but were made by mammals prior to the entombment of the specimen. Skeletal remains exhibiting these features may have furnished a source of food coveted particularly by the dire wolves with their strong jaws and teeth and by the smaller gnawing forms.

Weathering

The exposure of mammalian materials for any length of time at the surface of a tar pool or in its immediate vicinity ought to be indicated not only by the markings left by other mammals, but also by the type of preservation of the compact bony tissue of the skull and skeletal elements. The osseous remains occurring at Rancho La Brea usually retain their smooth external surfaces except where these have been modified for ligament or tendon attachment. In some instances, however, the material exhibits quite strikingly the effects of weathering, the specimens although thoroughly penetrated and stained by the oil possess a surface appearance so closely similar to that of weathered skeletal remains found lying on the plains at the present time as to fully justify the recognition of similar causes. An example may suffice.

No. 574, Figure 2, represents a skull of the large lion, *Felis atrox*, exhumed in Pit 3 of the Los Angeles Museum excavations at a depth of 9 feet. This specimen shows particularly well the effects of weathering on the ventral and lateral sides. Here the surface of the bones forming the hard palate and face are considerably roughened and scaled, the preservation of this portion of the skull being noticeably different from that of the bones forming the dorsal side of the face and brain-case. The latter retain in large measure their smooth surface. The teeth apparently have also suffered from exposure, the canines particularly exhibiting a shattered appearance. While the incisors and the cheek-teeth of one side are somewhat damaged, the skull and dentition do not give the impression that the material was transported for any great distance.

It appears reasonable to assume from the nature of the preservation that the skull lay with palate exposed either on the surface

of the tar or on the sand or soil adjacent to a tar pool. Furthermore, sufficient time apparently elapsed after the death of the animal and before entombment of its hard parts to permit decomposition or destruction of the soft structures and a weathering of the skull.

Conclusion

In the process of entombment of the osseous remains at Rancho La Brea the agencies assuring a record of the mammals of the region were undoubtedly on occasion very active. The large fauna found at this locality and the striking representation of certain members of the Carnivora lend substance to the belief that the tar traps were extremely efficient during their active periods. Furthermore, the lure presented by them explains in a convincing way the preponderance of predatory forms in the fossil assemblage. Among the latter the dire wolves are unquestionably the most prevailing type and their occurrence suggests, along with other evidence, that they were attracted to the scene by the moving drama of the traps but were not remiss in their desires to batten on a carcass. Here also occurred rodents who, unlike the mouse of the story, were content at times to feed on the stark remains of a kill.

LEGENDS FOR TEXT FIGURES

PLATE 1

Felis atrox Leidy. Posterior and lateral views of tibia showing markings made by teeth of mammals. Los Angeles Museum Collection, Rancho La Brea Pleistocene, California.

PLATE 2

Felis atrox Leidy. Ventral and dorsal views of skull. Note the weathered appearance of the palate and the absence of this type of preservation on the dorsal side. Los Angeles Museum Collection, Rancho La Brea Pleistocene, California.